

AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to FIG. 3. This sheet, which includes FIG. 4, replaces the original sheet including FIG. 4. In FIG. 3, previously element 30a, 30b is renumbered to element 30, and elements 32a and 32a, 32b are renumbered to element 32.

Attachments: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS

Applicants have amended the specification, drawings, and claim 1, and have canceled claims 10-13.

Accordingly, claims 1-5 are pending in the application.

Reexamination and reconsideration are respectfully requested in view of the following remarks.

DRAWINGS

The Office Action objects to reference numerations “30a, 30b” and “32a, 32b” in FIG. 3. Although Applicants respectfully submit that the original numerations are fully compliant with 37 C.F.R. § 1.84(p)(4), Applicants have revised FIG. 3 in an effort to satisfy the Examiner and advance the allowance of this application.

However, Applicants respectfully traverse the statement in the objection to FIG. 3 to the effect that “Figure 3 suggests a mixture of different nozzles in which the specification does not provide support.” Indeed, Applicants respectfully submit that this statement is contrary to the subsequent statement in the Office Action that “the nozzle recitation of ‘32a,32b’ is confusing since such a recitation suggests both nozzles 32a & 32b are present notwithstanding the disclosure in Figures 4 & 5 showing the embodiments of the nozzles in the alternate only.” Applicants agree that the specification provides for the possibility that “both nozzles 32a & 32b are present.” In that regard, Applicants respectfully submit that FIGs. 4 and 5 are exactly what the Office Action declares them to be: “*embodiments*.” Applicants respectfully note that the scope of Applicants’ claims is not limited to these particular embodiments, but rather all apparatuses coming “within the scope of the appended claims” (paragraph [0041]).

Therefore, Applicants respectfully traverse any suggestion in the Office Action that the specification does not provide support for a mixture of different nozzles.

Accordingly, Applicants respectfully request that the Examiner withdraw the objections to the drawings.

SPECIFICATION

The Office Action objects to the use of the recitations “30a, 30b” and “32a, 32b” in the specification.

Although Applicants respectfully submit that the original numerations are fully acceptable and clear, Applicants have revised the specification in an effort to satisfy the Examiner and advance the allowance of this application.

Accordingly, Applicants respectfully request that the Examiner withdraw the objections to the specification.

35 U.S.C. § 103

The Office Action rejects claims 1-3 and 5 under 35 U.S.C. § 103 over Applicants’ Admitted Prior Art (“AAPA”) in view of Schneider et al. U.S. Patent 6,263,829 (“Schneider”), and claim 4 under 35 U.S.C. § 103 over the AAPA in view of Schneider and further in view of Sakai U.S. Patent 3,717,439 (“Sakai”).

Applicants respectfully submit that claims 1-5 are all patentable over the cited prior art for at least the following reasons.

Claim 1

Among other things, the apparatus of claim 1 includes a plurality of process gas nozzles provided at regular intervals on a vertical sidewall of the chamber for supplying a process gas; and at least three cleaning gas nozzles provided below the plurality of process gas nozzles at regular intervals on the vertical sidewall of the chamber around the chuck to spray a cleaning gas uniformly in all directions in the chamber, the cleaning gas nozzles extending perpendicularly from the vertical sidewall.

That is, in the apparatus of claim 1, process gases are introduced into the chamber through process gas nozzles to process a substrate, and cleaning gases are separately introduced into the chamber through separate cleaning gas nozzles for the very different purpose of cleaning all sidewalls of the chamber.

Applicants respectfully submit that no such combination of features is

disclosed or suggested by the AAPA, Schneider, or any combination thereof.

It is evident from the figures that Schneider does disclose or suggest any arrangement with at least three cleaning gas nozzles provided below a plurality of process gas nozzles at regular intervals on the vertical sidewall of the chamber around the chuck to spray a cleaning gas uniformly in all directions in the chamber. Clearly, no such arrangement is disclosed by the AAPA. Therefore, no possible combination of the AAPA and Schneider could include such an arrangement.

The Office Action states that mere duplication of parts has no patentable significance, citing In re Harza. However Applicants have not recited a mere duplication of parts. Rather, Applicants have recited that at least three cleaning gas nozzles are provided at regular intervals on the vertical sidewall. Indeed, this is similar to claim 7 in the patent application at issue in In re Harza, which the Court found patentable over the cited art, wherein the Court held that the plurality of ribs themselves did not confer patentability to claim 1, but the recitation of a positional relationship (“each rib being substantially as high as the spacing between adjacent ribs”) did confer patentability to claim 7. Here, Applicants have recited that at least three cleaning gas nozzles are provided at regular intervals on the vertical sidewall. Applicants have also discovered and disclosed that such an arrangement provides remarkable advantages over the prior art, namely, the cleaning gas is thereby uniformly distributed in all directions to more effectively clean the chamber and prevent damage to wafers from polymers dropping from internal walls of the chamber onto the wafers (see, e.g., paragraphs [00040], [00010]-[00011], and [00035]).

Moreover, the recited at least three cleaning gas nozzles do something different that the process gas nozzles of the AAPA and Schneider, namely, they distribute a cleaning gas (rather than a process gas) uniformly in all directions to clean sidewalls of the chamber. Meanwhile, the single cleaning gas nozzle of the AAPA distributes cleaning gas in one direction only.

Therefore, Applicants respectfully submit that the apparatus of claim 1 cannot be produced by any combination of the AAPA and Schneider.

Furthermore, Applicants respectfully traverse the proposed combination of the AAPA and Schneider as lacking any suggestion or motivation in the prior art. The Office Action states, without any citation or support, that the motivation for the proposed combination would have been “in order to improve the uniformity of applying cleaning fluid¹ which would result in a more uniform efficient cleaning.” Meanwhile, M.P.E.P. § 2143 provides that:

“The teaching or suggestion to make the claimed combination must be found in the prior art, not in applicant’s disclosure.”

Here, the motive suggested by the Office Action is apparently a hindsight rationale for a combination not found anywhere in the prior art. The Office Action does not point to anywhere in the cited references with this motive is given, nor did the Examiner submit an affidavit as required by 37 CFR 1.104(d)(2) if this proposed motive were based on facts within his personal knowledge (see M.P.E.P. § 2144.03). Applicants request such an affidavit if this rejection continues to be maintained based a motive for combination not explicitly suggested in the prior art.

Therefore, for at least these reasons, Applicants respectfully traverse the proposed combination of the AAPA and Schneider.

Accordingly, for at least all of the foregoing reasons, Applicants respectfully submit that the apparatus of claim 1 is patentable over the cited prior art.

Claims 2-3 and 5

Claims 2-3 and 5 depend from claim 1 and are all deemed patentable for at least the reasons set forth above with respect to claim 1.

Claim 4

Claim 4 depends from claim 1. Applicants respectfully submit that Sakai does not remedy the shortcomings of the AAPA and Schneider with respect to claim 1. Accordingly, Applicants respectfully submit that claim 4 is patentable over any

¹ Applicants respectfully see no mention of any “cleaning fluid” in either the AAPA or Schneider.

possible combination of the AAPA, Schneider and Sakai for at least the reasons set forth above with respect to claim 1.

Furthermore, Applicants respectfully traverse the proposed combination of Sakai with the AAPA and Schneider as lacking any motivation in the prior art.

The Office Action states that the motivation for the proposed combination would be to “to provide an apparatus of simple construction capable of producing a semiconductor element while providing uniform thickness, composition and dimensional precision.” Applicants respectfully submit that the supposed benefits would not follow from the proposed combination for a very simple reason. The supposed benefits cited by the Office Action pertain to Sakai’s use of a spiral nozzle to introduce process gases into the process chamber, not cleaning gases. While it is quite understandable how the use of a spiral nozzle to introduce a process gas into a chamber during a device manufacturing (e.g., deposition) process might provide a semiconductor element with a more “uniform thickness, composition and dimensional precision,” the Office Action fails to explain at all why it is believed that use of a spiral nozzle to introduce a cleaning gas into a chamber during a chamber cleaning process would create any such benefits for any semiconductor device! Indeed, it would appear that no such benefits would accrue to the proposed combination.

Therefore, for at least these reasons, Applicants respectfully traverse the proposed combination of Sakai with the AAPA and Schneider.

Accordingly, for at least all of the foregoing reasons, Applicants respectfully submit that the apparatus of claim 4 is patentable over the cited prior art.

CONCLUSION


In view of the foregoing explanations, Applicants respectfully request that the Examiner reconsider and reexamine the present application, allow claims 1-5, and pass the application to issue. In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact Kenneth D. Springer (Reg. No. 39,843) at (703) 715-0870 to discuss these matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 50-0238 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17, particularly extension of time fees.

Respectfully submitted,

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FIG. 3

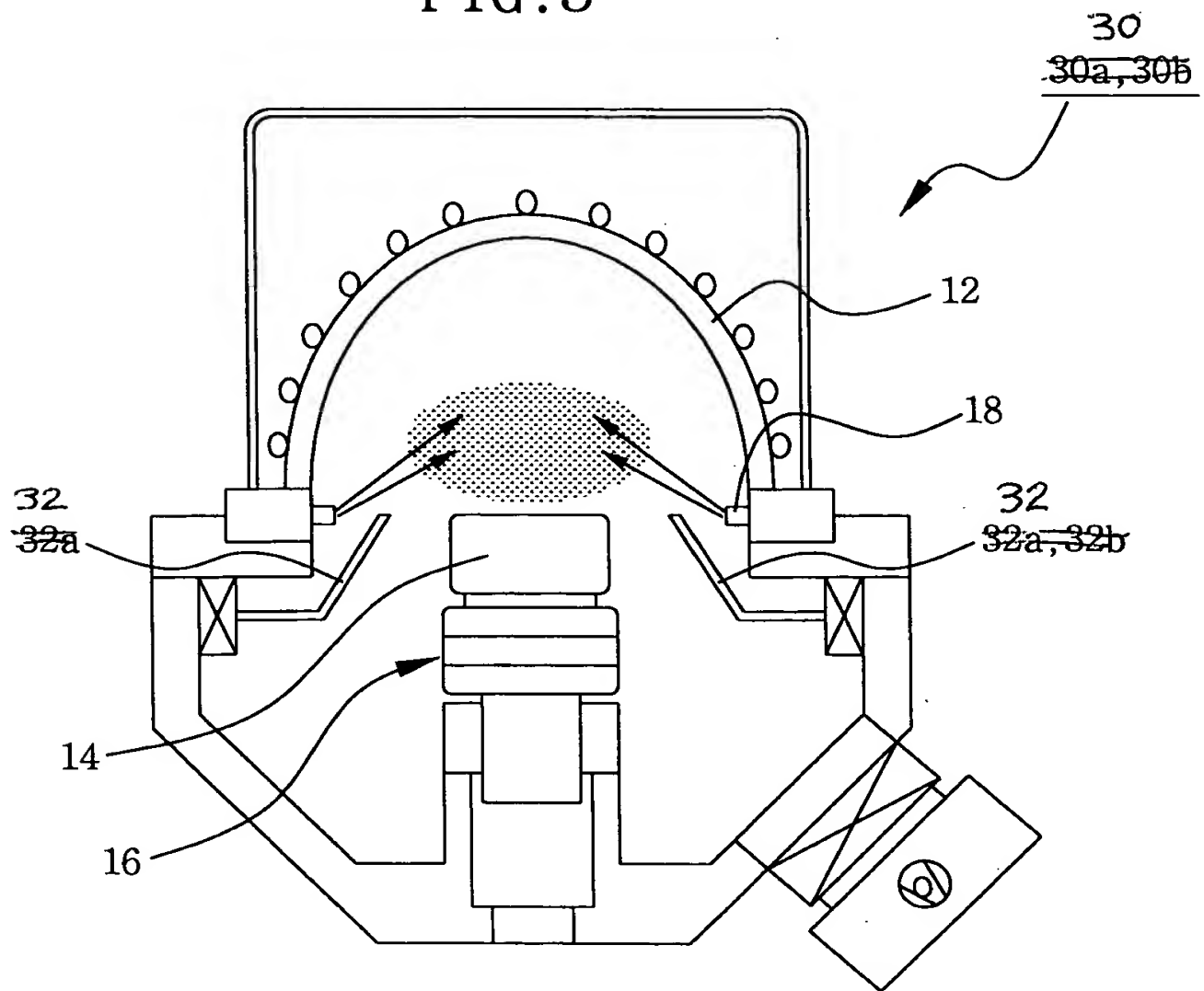


FIG. 4

